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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/752,422

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Yi-Chou Chen

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07/05/2005

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EXAMINER

HUYNH, ANDY

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/752,422

Applicant(s)

CHEN ET AL.

Examiner

Andy Huynh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 8-11, 13 and 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 12 and 14 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02/23/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

In the Response to Restriction Requirement dated June 20, 2005, Applicant has elected without traverse Invention I, Claims **1-7, 12 and 14**, drawn to a device is acknowledged.

Accordingly, Claims **8-11, 13 and 15-20** are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 35 § 1.142(b) and MPEP § 821.03. Applicant has the right to file a divisional application covering the subject matter of the non-elected Claims **8-11, 13 and 15-20**, drawn to a method.

### ***Information Disclosure Statement***

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed 02/23/2004. The references cited on the PTOL 1449 form have been considered.

### ***Claim Objections***

Claim **4** is objected to because of the following reasons.

In line 4, "top and bottom electrodes" should read – another top and bottom electrodes --.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims **1-3, 6 and 7** are rejected under 35 U.S.C. 102(e) as being anticipated by Lee (USP 6,841,793).

Regarding claim **1**, Lee discloses in Fig. 2A and the corresponding texts as set forth in column 5, line 45-column 7, line 4, a memory cell structure, comprises:

a substrate/an insulating layer 240 having a bottom electrode 220a at least partially disposed within the substrate/the insulating layer;

a pad/a buffer insulating layer region 300a disposed at least partially over the substrate/the insulating layer;

a phase change element 340a disposed at least partially over the substrate/the insulating layer and adjacent to the pad/the buffer insulating layer region, the phase change element being operatively coupled to the bottom electrode; and

a top electrode 400a operatively coupled to the phase change element.

Regarding claim **2**, Lee discloses in Fig. 2A the phase change element is formed on a sidewall of the pad/the buffer insulating layer region.

Regarding claim **3**, Lee discloses in Fig. 2A the pad/the buffer insulating layer region comprises a top surface, a bottom surface, and at least two sidewalls disposed between the top and bottom surfaces; and the phase change element is formed on one of the at least two sidewalls of the pad/the buffer insulating layer region.

Regarding claim 6, Lee discloses in Fig. 2A the bottom electrode is disposed within the substrate/the insulating layer; the pad/the buffer insulating layer region is disposed over and substantially parallel to a top surface of the substrate/the insulating layer; the phase change element is disposed over the substrate/the insulating layer; and the phase change element contacts both the bottom electrode and the top electrode.

Regarding claim 7, Lee discloses in Fig. 2A the phase change element has its longest dimension parallel to the substrate/the insulating layer.

Claims 12 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Lowrey et al. (USP 6,750,079 hereinafter referred to as "Lowrey").

Regarding claim 12, Lowrey discloses in Fig. 1 and the corresponding texts as set forth in column 4, line 27-column 5, line 8, column 18, line 40, a memory cell, comprises:

- a substrate/dielectric regions 128, 140 having a bottom electrode 130a, 130b;

- a phase change element 290 having a maximum length extending between two opposing ends and being disposed adjacent to the bottom electrode; and

- a top electrode 300 adjacent to the phase change element;

wherein the bottom electrode 130a, 130b and the top electrode 300 are disposed at the opposing ends of the phase change element.

Regarding claim 14, Lowrey discloses in Fig. 1 and the corresponding texts as set forth in column 4, line 27-column 5, line 8, column 18, line 40, a memory cell, comprises:

- a substrate/dielectric regions 128, 140 having a bottom electrode 130a, 130b;

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at least one phase change element 290 disposed over a surface of the substrate/the dielectric regions and adjacent to the bottom electrode; and

a top electrode 300 adjacent to the phase change element;

wherein the phase change element has its longest dimension parallel to the surface of the substrate/the dielectric regions.

### *Allowable Subject Matter*

Claims **4 and 5** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. The prior art of record, taken alone or in combination, fails to teach the claimed invention the memory cell structure further comprises: another phase change element formed on another one of the at least two sidewalls of the pad; and top and bottom electrodes operatively coupled to the other phase change element as recited in claim **4**.

### *Conclusion*

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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06/29/05



Andy Huynh

Patent Examiner